

*Transmitted Via Facsimile to (571) 273-8300*    Hammonds Dkt. No. ML00H02/P-US (SPLG-4)  
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### Remarks

Claims 1-13 and 31-37 are currently pending in the application. Claims 1-13 and 31-37 stand rejected. Claims 1, 8-11, 31, and 34-37 have been amended herein. Claim 38 has been newly added herein. No new matter has been added. Upon entry of this amendment, claims 1-13 and 31-38 will be pending in this application. It is respectfully submitted that the pending claims define allowable subject matter.

Claims 1, 3-6, 8-13, 31, 33, 34, 36, and 37 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Korte (*High-throughput replica optics*, Applied Optics, Vol. 27, No. 8) in view of Pichel (U.S. Patent 3,428,533) or Jochim (U.S. Patent 3,378,469). Applicants respectfully traverse this rejection.

Korte describes different methods for forming optics including an electroforming-type replication technique for the production of x-ray optics (page 1442, column 1). The process includes coating a mandrel surface with a conductive separation layer that is either chemically applied or evaporated onto the surface of the mandrel. An electroforming process is then performed in a controlled bath wherein a layer of nickel is formed on the conductive separation layer. It was then noted that nickel shells with a thickness between 5 and 12 mm were produced. However, the large mass and the internal stress in the layer became so high that the glass mandrel was destroyed during the separation process (page 1442, column 2).

Pichel describes a method for manufacturing a metal master for a parabolic mirror. In particular, a plastic sub-master having substantially the same shape and optical accuracy as a glass master is formed (column 3, lines 33-36). The plastic layer 13 is rigidized with a member 14 by means of epoxy or other adhesive 15 and glass master 10 removed (column 3, lines 42-54). A replica metal master from the plastic sub-master is then prepared by immersing the sub-master in an electroplating bath (column 3, lines 59-63). The optical surface of the sub-master is sensitized or rendered electrically conducting by coating it with a thin film or layer of metal, such as silver, which is deposited on the optical surface of the plastic sub-master (column 3, lines 64-75).

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Next, employing necessary control to ensure uniform stress-free deposition, a layer of nickel 17 is electroplated over silver layer 16 (column 4, lines 6-11). Proper circulation and temperature maintenance of the electroplating solution, uniform rotation of the sub-master cathode, maintaining a uniform composition or strength of the electroplating solution, etc., are provided and which contribute to the deposition of a nickel layer of uniform thickness that is relatively stress free (column 4, lines 11-17). A backing or rigidizing structure 18 is mounted over the nickel layer, and with the rigidizing structure 18 firmly on nickel layer 17, the replica master structure separated from the plastic sub-master (column 4, lines 21-40). Then, the silver layer is chemically stripped from the nickel layer in such a manner that the optical surface of the replica master, which is the common surface between the silver and nickel layers, is not degraded (column 4, lines 45-49).

Jochim describes a similar method for fabricating an electroformed parabolic mirror using a parabolically-shaped glass master with the addition of removing the sub-master from the bath to apply a mesh structure that will become a rigid backing structure to support the nickel layer (column 4, lines 13-18). Thus, following the removal of the sub-master, a mesh backing structure 18 is mounted over nickel layer 17 (column 4, lines 18-20).

Claim 1, as amended, recites a method of manufacturing a telescope mirror comprising, among other things, attaching to a mirror body a supporting structure comprising at least one of a ring geometry and at least one actuator for adapting and correcting the geometry of the telescope mirror. The combination of Korte with either Pichel or Jochim fails to describe or suggest such a method. Rather, in contrast to the ring geometry or actuator of the claimed supporting structure, Korte describes a nickel shell reinforced with a filled epoxy material. Korte does not describe or suggest that the filled epoxy material has a ring geometry or includes at least one actuator for adapting and correcting the geometry of a telescope mirror. Neither Pichel nor Jochim make up for the deficiencies of Korte. Thus, the combination of Korte with either Pichel or Jochim does not describe or suggest a method as recited in claim 1.

Claims 3-6, 8-13, and 37 depend from independent claim 1. When the recitations of claims 3-6, 8-13, and 37 are considered in combination with the recitations of

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claim 1, Applicants submit that claims 3-6, 8-13, and 37 are likewise patentable over Korte in combination with Pichel or Jochim for at least the same reasons set forth above.

Claim 31, as amended, recites a method of manufacturing a telescoping mirror comprising attaching a supporting structure to a mirror body after releasing the mirror body from a mandrel. The combination of Korte with either Pichel or Jochim fails to describe or suggest such a method. Rather, Korte describes a mirror shell reinforced with layers of epoxies that are applied before the mirror shell is separated from a mandrel. Neither Pichel nor Jochim make up for the deficiencies of Korte. Thus, the combination of Korte with either Pichel or Jochim does not describe or suggest a method as recited in claim 31.

Claims 33, 34, and 36 depend from independent claim 31. When the recitations of claims 33, 34, and 36 are considered in combination with the recitations of claim 31, Applicants submit that claims 33, 34, and 36 are likewise patentable over Korte in combination with Pichel or Jochim for at least the same reasons set forth above.

Claims 2, 32 and 35 have been rejected under 35 USC § 103(a) as being unpatentable over Korte in view of Pichel or Jochim, and further in view of George (U.S. Patent 4,648,944) or Vaaler (U.S. Patent 4,786,376). Applicants respectfully traverse this rejection.

Claim 2 depends from independent claim 1, which is recited above. As discussed above, Korte in combination with Pichel or Jochim does not describe or suggest a method as recited in claim 1. Neither George nor Vaaler make up for the deficiencies of Korte, Pichel, and Jochim. When the recitations of claim 2 are considered in combination with the recitations of claim 1, Applicants submit that claim 2 is likewise patentable over the combination of Korte, Pichel, and Jochim with George or Vaaler for at least the reasons set forth above.

Claims 32 and 35 depend from independent claim 31, which is recited above. As discussed above, Korte in combination with Pichel or Jochim does not describe or suggest a method as recited in claim 31. Neither George nor Vaaler make up for the deficiencies of Korte, Pichel, and Jochim. When the recitations of claims 32 and 35 are considered in combination with the recitations of claim 31, Applicants submit that claims 32 and 35 are

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likewise patentable over the combination of Korte, Pichel, and Jochim with George or Vaaler for at least the reasons set forth above.

Claim 7 is rejected under 35 USC § 103(a) as being unpatentable over Korte in view of Pichel or Jochim, and further in view of Engelhaupt (U.S. Patent 6,406,611). Applicants respectfully traverse this rejection.

Claim 7 depends from independent claim 1, which is recited above. As discussed above, Korte in combination with Pichel or Jochim does not describe or suggest a method as recited in claim 1. Neither George nor Vaaler make up for the deficiencies of Korte, Pichel, and Jochim. When the recitations of claim 7 are considered in combination with the recitations of claim 1, Applicants submit that this claim 7 is likewise patentable over the combination of Korte, Pichel and Jochim with Engelhaupt for at least the reasons set forth above.

Thus, Applicants respectfully request the rejections of claims 1-13 and 31-37 under 35 U.S.C. §103(a) be withdrawn.

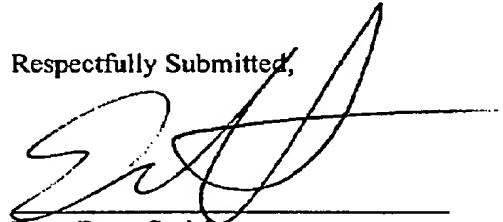
New claim 38 recites a method of manufacturing a telescope mirror comprising the steps of (a) providing a mandrel defining the geometry of the telescope mirror, (b) depositing a reflective layer on the mandrel surface, (c) electroforming a mirror body onto the reflective layer by an electrochemical process, (d) releasing the mirror body with the reflective layer from the mandrel before any supporting structure is attached to the mirror body and without changing the mandrel such that the mandrel can be reused to manufacture another telescope mirror, wherein the electroforming process and the release process are controlled such that the building up of internal mechanism tension within the mirror body is suppressed. Applicants submit that none of the cited prior art, considered alone or in combination, describes or suggests the method recited in new claim 38. For example, Korte does not describe or suggest releasing a mirror body with a reflective layer from a mandrel before any supporting structure is attached to the mirror body and without changing the mandrel such that the mandrel can be reused to manufacture another telescope mirror. Rather, the only mirror shells described by Korte that can be separated from a mandrel without damaging the mandrel include reinforcing layers of epoxy applied to the

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mirror shell before separation from the mandrel. The only mirror shells described by Korte that do not include the reinforcing epoxy layers applied thereto before separation from the mandrel are described as destroying the mandrel during the separation process. Accordingly, new claim 38 is submitted to be patentable over the prior art.

In view of the foregoing amendments and remarks, it is respectfully submitted that the prior art fails to teach or suggest the claimed invention and all of the pending claims in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited. Should anything remain in order to place the present application in condition for allowance, the Examiner is kindly invited to contact the undersigned at the telephone number listed below.

Respectfully Submitted,



Evan Reno Sotiriou

Reg. No.: 46,247

THE SMALL PATENT LAW GROUP LLP

611 Olive Street, Suite 1611

St. Louis, MO 63101

(314) 584-4080

(314) 584-4061 (Fax)